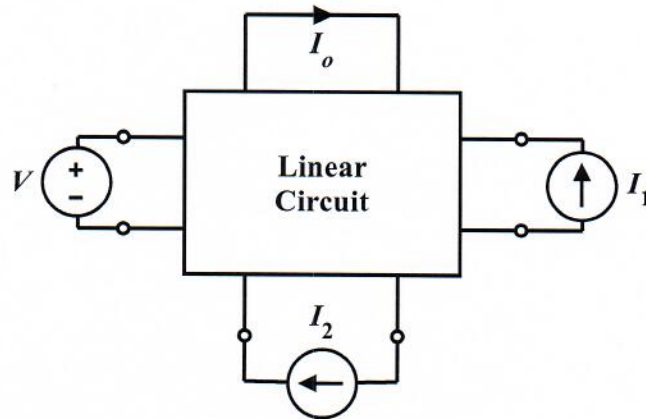


EE/EET 2240  
Homework Problem #024



$I_o = 20 \text{ mA}$  when  $V = 2 \text{ V}$ ,  $I_1 = 0 \text{ A}$  and  $I_2 = 2 \text{ A}$ .

$I_o = 30 \text{ mA}$  when  $V = 5 \text{ V}$ ,  $I_1 = 2 \text{ A}$  and  $I_2 = 1 \text{ A}$ .

$I_o = 50 \text{ mA}$  when  $V = 6 \text{ V}$ ,  $I_1 = 3 \text{ A}$  and  $I_2 = 5 \text{ A}$ .

What will  $I_o$  be when  $V = 4 \text{ V}$ ,  $I_1 = 1 \text{ A}$  and  $I_2 = 3 \text{ A}$ ?

Since it's a linear circuit,

$$I_o = K_1 \cdot V + K_2 \cdot I_1 + K_3 \cdot I_2$$

For the data given:

$$20 = 2K_1 + 0 + 2K_3$$

$$30 = 5K_1 + 2K_2 + 1K_3$$

$$50 = 6K_1 + 3K_2 + 5K_3$$

Solving for the  $K$ 's yields:

$$K_1 = 6$$

$$K_2 = -2$$

$$K_3 = 4$$

$$\begin{aligned} \text{So, } I_o &= 6(4) - 2(1) + 4(3) \\ &= 34 \text{ mA} \end{aligned}$$